

Work Order ID 69903

Tuesday, May 24, 2011 12:57:21 PM



Page 1

Item ID: D3488-041

Accept



Setup Start



Revision ID:

Stop



Item Name: Blade Fitting Assembly, LH

Start Date: 5/24/2011 Start Qty: 12.00



Cust Item ID:

Required Date: 5/31/2011 Req'd Qty: 12.00

Customer:

Reference:

Approvals:

Process Plan:

[Signature]

Date: 11-05-24

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr	
D3488	Rev B	FAI REV: B/D

100	DOOSAN LATHE	0.00							
	Doosan	Memo	0.00	20	11.6.8	12	0		
Doosan Lathe	1-Turn as per Dwg DSK 101 & Folio FA625 2-Deburr								

110	QC2- Inspect parts off machine FAI/FAIB	0.00							
	QC	Memo	0.00	20	11.6.8	12	0		
Quality Control									

120	HAAS CNC VERTICAL MACHINING #1	0.00							
	HAAS 1	Memo	0.00	20	11/07/06	12	0		
HAAS CNC vertical machine #1	1-Machine as per Folio FA625 & Dwg D3488 2-Deburr								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D 8488-041 PAR #: N/A Fault Category: Mechanism NCR: (Yes) No DQA: NA Date: 11.07.13
 Resolution: use as is Disposition: use as is QA: N/C Closed: (K) Date: 11/07/13

NCR: 69903		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11.6.8	#100	Drilled 2.150" hole oversize to 2.171" to remove vibration that occured when drill/bore compo insert edge broke down.	UP 11.06.09 DS/WR	Acceptable based on revised SR calculations attached. Margin of safety still positive.	UP 11.6.8 11.06.09	UP 11.06.09 DS/WR	UP 11.06.09 DS/WR	UP 11.06.09 DS/WR
		R.L. Tooling / Process						



NOTE: Date & initial all entries




Work Order ID 69903

Tuesday, May 24, 2011 12:57:21 PM

Page 2

Item ID: D3488-041 Accept  Setup Start 
Revision ID: Stop 
Item Name: Blade Fitting Assembly, LH
Start Date: 5/24/2011 Start Qty: 12.00  Cust Item ID:
Required Date: 5/31/2011 Req'd Qty: 12.00  Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start 
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop 

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130  QC Quality Control	QC2- Inspect parts off machine FAI/FAIB Memo	0.00 0.00		<i>only 11/07/06</i>		<i>12</i>	<i>0</i>		
140  QC Quality Control	QC8- Inspect parts - second check Memo	0.00 0.00		<i>B.A 11/07/06</i>		<i>12</i>	<i>0</i>		
150  HandFinish Hand Finishing	Chemical Conversion Coat per QSI005 4.1 Memo	0.00 0.00				<i>12</i>	<i>0</i>	<i>BL 11-7-11</i>	

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

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Start Date: 5/24/2011 Start Qty: 12.00



Cust Item ID:

Required Date: 5/31/2011 Req'd Qty: 12.00

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

160

White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum

0.00



Powdercoat

Memo

START TIME:

OVEN TEMPERATURE:

FINISH TIME:

Powder Coating

170

QC3- Inspect Part Finish

0.00



QC

Memo

Quality Control

180

HandFinishing

0.00



HandFinish

Memo

Hand Finishing

Install Inserts as per Dwg D3488

0.00

Handwritten signature and date: 12/11/07/11

Handwritten: 12 0 11 11/07/11

Handwritten: 12 0 11 11/07/11

Handwritten: m u274 S

Handwritten: 3200F

Handwritten: 1:30

Handwritten: 2:00

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Work Order ID 69903

Tuesday, May 24, 2011 12:57:21 PM



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Start Date: 5/24/2011 Start Qty: 12.00



Cust Item ID:

Required Date: 5/31/2011 Req'd Qty: 12.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

190

QC5- Inspect part completeness to step on W/O

0.00

Swair



QC

Memo

0.00

Quality Control

(42)

200

Identify as per dwg & Stock Location FR-8

0.00



Packaging

Memo

0.00

Packaging

12 6 11/07/12

210

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

11/7/13 JF
MF 11-07-12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Tuesday, May 24, 2011 12:57:27 PM

Page 1

Work Order ID: 69903

Parent Item: D3488-041

Parent Item Name: Blade Fitting Assembly, LH

Start Date: 5/24/2011

Required Date: 5/31/2011

Start Qty: 12.00

Required Qty: 12.00

Comments: IPP Rev:A New Issue 06-02-28 JLM
IPP Rev:B As per Rev B 06-03-30 JLM
IPP Rev:C Now On Doosan Lathe JLM Verified BY:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

ALS7-1032-225

Purchased

No

Each

700.0000

48



21

4/10/12

INSERT

Location

Loc Qty

Loc Code

ST282

700

100896

100

111529

300

111581

300

1117710

48

D6103-003

Manufactured

No

Each

13.0000

12



2

11-6-8

Round Billet, Aluminum

Location

Loc Qty

Loc Code

MAT

12

68918

12

MAT043

1

68173

1

1

11

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	69903
Description: Blade Fitting, LH / Turning Detail for D3488-1/-2		Part Number:	D3488-1
Inspection Dwg: D3488 / DSK101 Rev: B / D		Page 1 of 2	

FIRST ARTICLE INSPECTION CHECKLIST

☒ **First Article**

 ☐ **Prototype**

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Lathe Section						
Ø2.150	+/-0.005	2.145	✓		22.02	
Ø2.780	+/-0.005	2.780	✓			
Ø3.125	+/-0.010	3.125	✓			
Ø3.346	+/-0.010	3.346	✓			
0.125 x 45°	+/-0.010 x +/-0.1°	.125x45°	✓			
8.000	+0.030/-0.000	8.012	✓			
9.250	+/-0.010	9.250	✓			
0.188	+/-0.010	.188	✓			
R0.032	+/-0.010	R.032	✓			
R0.062	+/-0.010	R.062	✓			
Ø0.297	+0.005/-0.001	.300	✓			
Ø0.430	+/-0.010	.432	✓			
0.100	+/-0.010	.098	✓			
0.125	+/-0.010	.128	✓			
2.620	+/-0.010	2.620	✓			
3.500	+/-0.010	3.500	✓			
1.005	+/-0.010	1.005	✓			
Ø0.484	+0.005/-0.001	.485	✓			
1.180	+/-0.010	1.180	✓			
3.150	+/-0.010	3.150	✓			
3.070	+/-0.010	3.070	✓			
R0.063	+/-0.010	R.063	✓			

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	69903
Description: Blade Fitting, LH / Turning Detail for D3488-1/-2		Part Number:	D3488-1
Inspection Dwg: D3488 / DSK101 Rev: B / D		Page 2 of 2	

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Milling Section						
Ø0.508	+0.006/-0.001	0.508	—		Vern ML-7	
0.750	+/-0.010	0.750	—		"	
1.500	+/-0.010	1.500	—		"	
11.18	+/-0.030	11.187	—		Vern RMC-02	
R0.062	+/-0.010	R.062	—		R-6	
0.125	+/-0.010	0.127	—		Vern ML-7	
0.590	+/-0.010	0.589	—		"	
0.793	+/-0.010	0.799	—		"	
1.351	+/-0.010	1.353	—		"	
1.317	+/-0.010	1.319	—		"	
1.802	+/-0.010	1.801	—		"	

Measured by:	mf	Audited by:	B.A	Prototype Approval:	N/A
Date:	11/07/06	Date:	11/07/06	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	06.03.31	New Issue	KJ/JLM	
B	08.09.19	Reformat P/O D3488-041	KJ/JLM	
C	08.12.02	Dimension 8.000 removed	KJ/JLM	

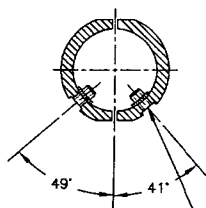
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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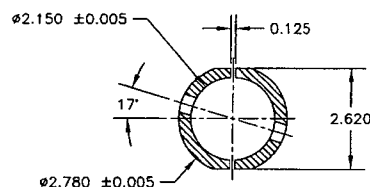


SECTION B-B

Ø0.297
C'BORE Ø0.430 x 0.100
INSTALL ALS4-1032-225 (OR AKS4-1032-225
OR ALS7-1032-225 OR AKS7-1032-225)
INSERTS AFTER FINISH
(4 PLACES)

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 09903

011-05-24
4



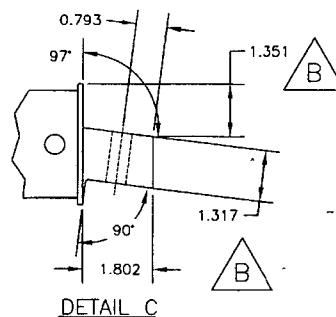
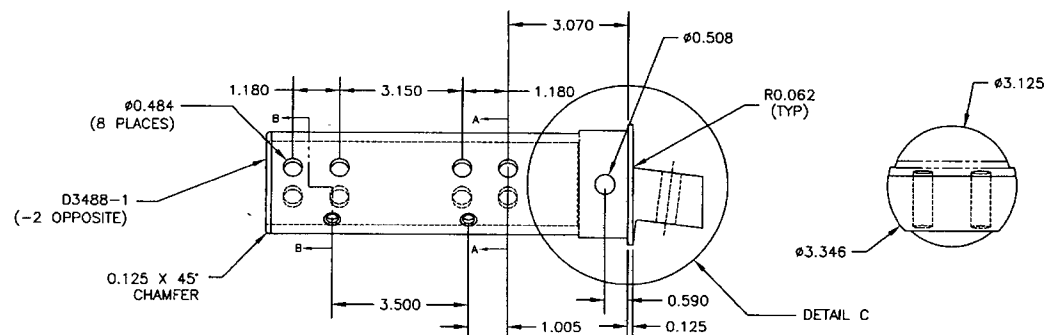
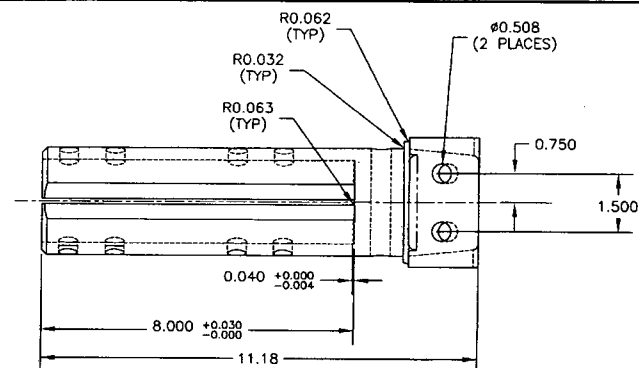
SECTION A-A

D3488-041/-042 BLADE FITTING ASSEMBLY PARTS LIST

QTY -041	QTY -042	PART NUMBER	DESCRIPTION
X		D3488-041	BLADE FITTING ASSEMBLY (LH)
	X	D3488-042	BLADE FITTING ASSEMBLY (RH)
1		D3488-1	BLADE FITTING (LH)
	1	D3488-2	BLADE FITTING (RH)
4	4	ALS4-1032-225 or AKS4-1032-225 or ALS7-1032-225 or AKS7-1032-225	INSERT

D3488-041/-042 BLADE FITTING

- MATERIAL: MAKE D3488-1/-2 FROM ALUMINUM 7075-T7351 ROUND BAR
PER QQ-A-225/9
(REF. DART MATERIAL SPEC M7075T73R)
- FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1
POWDER COAT WHITE (REF 4.3.5.1) PER DART QSI 005 4.3
- BREAK UNMARKED SHARP EDGES 0.010 TO 0.020
- INSTALL INSERTS AFTER POWDER COAT
- ALL DIMENSIONS ARE IN INCHES
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED



DETAIL C

D3488-041 SHOWN (D3488-042 OPPOSITE)

RELEASED
06-03-15 PH
PER DS
ECN #737

B	06.03.15	CHANGE THICKNESS
A	05.12.20	NEW ISSUE
DESIGN	PH	DRAWN BY PH
CHECKED	A	APPROVED A
DATE	06.03.15	TITLE
		BLADE FITTING
		SCALE
		1:3

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DART AEROSPACE USA, INC.

DART DART AEROSPACE USA, INC.
PORT HADLOCK, MA

DRAWING NO. D3488 REV. B
SHEET 1 OF 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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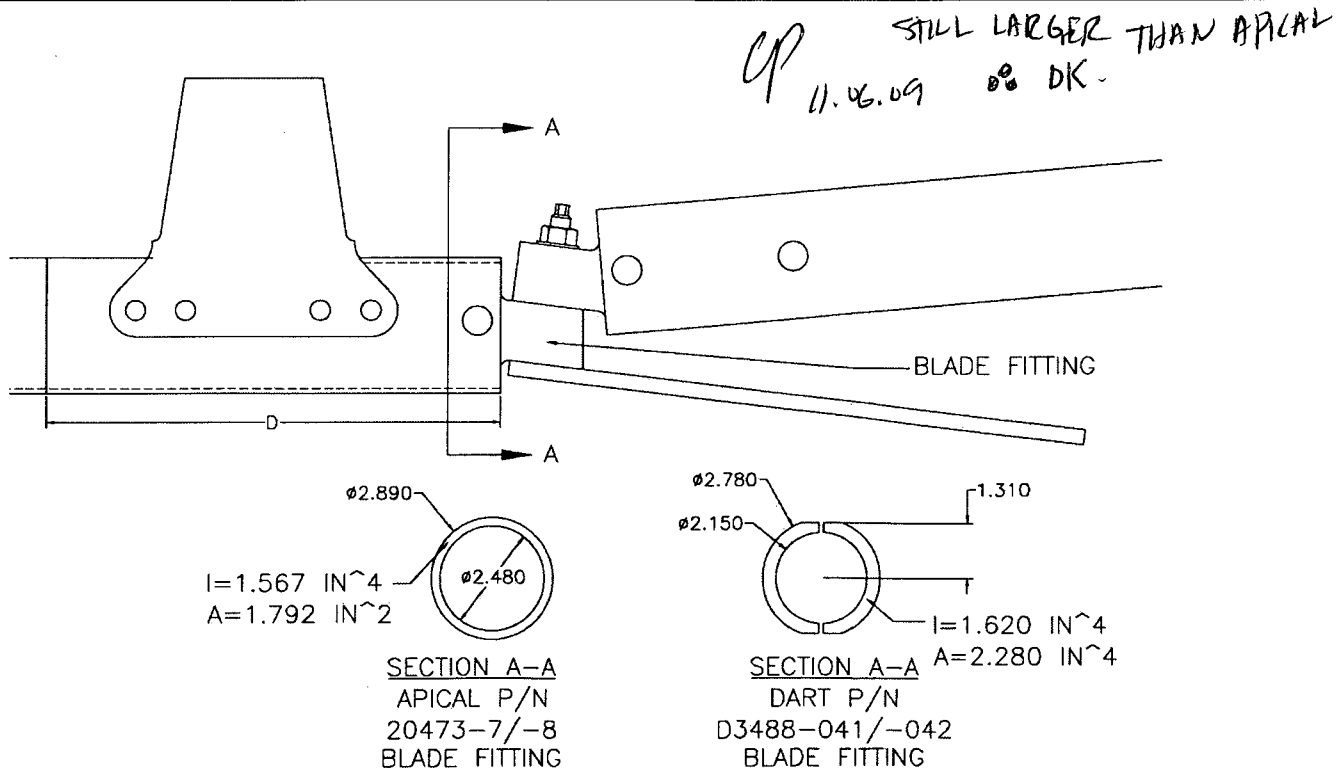
REF

For installation of the Apical Tri-bag and Apical Cylindrical Float bag systems onto OEM skid tubes; it is required that the OEM P/N 350A41-1077-24/-25 blade fitting be substituted with the Apical P/N 20473-7/-8 blade fitting. In the proposed Dart skid tube configuration, the Dart D3488-041/-042 blade fitting will replace the Apical P/N 20473-7/-8 blade fitting.

In the Dart system, blade fitting D3488-041/-042 will be used to transfer load into the web of the skid tube assembly. On the outside of the skid tube, D3488-041/-042 is dimensionally identical to the Apical P/N 20473-7/-8 blade fitting and is manufactured from the same 7075-T7351 material. Therefore, the Dart blade fitting and the Apical blade fitting have identical structural capability. The longitudinal location of the holes on the D3488-041/-042 blade fitting used to mount the aft crosstube are identical to the Apical P/N 20473-7/-8 blade fitting. On the inside of the skid tube, D3488-041/-042 has been designed to withstand higher bending moments than the Apical fitting.

The following table compares the Dart D3488-041/-042 blade fitting to the Apical 20473-7/-8 blade fitting.

Component	Dart D3488-041/-042	Apical P/N 20473-7/-8
Material	7075-T7351 per QQ-A-225/9	7075-T7351 per QQ-A-225/9
(I) Moment of Inertia of portion inside skid tube	1.620 in ⁴ <i>1.581</i> (from D3488-041/-042 dwg)	1.567 in ⁴ (from D20473-7/-8 dwg)
(C) Distance to outer fibers	1.310 in (from D3488-041/-042 dwg)	1.445 in (from D20473-7/-8 dwg)
(A) Area at section A-A	2.280 in ² <i>2.212</i>	1.792 in ²
Z=I/C at section A-A	1.234 in ³ <i>1.207</i>	1.084 in ³
D	10.69 in	10.53 in



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Revision: **B**

Date: 06.02.23